Mechanism for Establishing a Communications Group

Field of the invention

The present invention relates to communications systems, and more particularly to mechanisms for establishing a communications group.

Background of the invention

In order to create a group to be used e.g. for group communications information on the members of the group is required. The creator of the group has to find out who should belong to the group and what are the identifications of their user equipment.

However, the collecting of information is difficult and time-consuming e.g. in situations where the group should be established as soon as possible and the members of the group are in the same room or outside near each other.

In the state of the art the information is usually pulled together manually. In some cases MSISDN (Mobile Subscriber International Integrated Services Digital Network) number, which uniquely defines the mobile subscriber, is used as the user equipment identification. It is also possible that some other user equipment identification (such as a nickname), which should be an easy and unique identification, has to be determined for communication inside the group. If this other identification is not known, every member of the group has to be asked for it separately. After that, user equipment identifications have to be entered to the terminal of the group creator, as well.

Figure 1 illustrates a table of group information that has to be collected in order to create the group. The table consists of the names of users, their nicknames and their identification codes. User A can have name Mike Miller, nickname "Mike" with MSISDN number 050-54321 as the identification number.

Another possibility for pulling information together in the state of the art is to use electronic business cards. After user equipment has sent their own information to the group creator, the group creator collects all that information from several different cards manually to his terminal. However, also this type of creation of groups with the help of business cards is rather complex.

Brief disclosure of the invention

It is thus an object of the present invention to provide a method and

an apparatus for implementing the method more effectively and faster. The objects of the invention are achieved by methods, user equipment and communications system disclosed in the independent claims. The preferred embodiments of the invention are disclosed in the dependent claims.

5   The invention is based on the idea of establishing a communications group in a communications network by sending from master user equipment to at least one slave user equipment via a communications medium, preferably a short-range communications medium that is separate from the primary communications medium of the communications network, a request prompting the

10   user of the slave user equipment to send user information for group establishment in the communications network. The slave equipment sends to the master user equipment over the communications medium a response comprising user information for group establishment. The master user equipment creates or modifies the group based on the information received in responses from the

15   at least one slave user equipment. Finally, the master user equipment sends the information on the created or modified group to the communications network or to the slave user equipments for establishing said group.

An advantage of the method and arrangement of the invention is easier and faster establishment of a group especially inside an office or outside

20   between user equipment located near each other, and hence easier and faster establishment of group communication.

Brief description of the drawings

In the following the invention will be described in greater detail by means of preferred embodiments with reference to the attached drawings, in

25   which

Figure 1 illustrates a table of group information;

Figure 2 is a signalling chart for establishing a group;

Figure 3 is an example of a group to be established;

Figure 4 is a flow diagram illustrating an example of operation of

30   user equipment as slave user equipment;

Figure 5 is a flow diagram illustrating an example of operation of user equipment as master user equipment;

Figure 6 is a simplified block diagram illustrating an example of a user terminal wherein the present invention can be applied; and

Figure 7 illustrates a communication system wherein clients entering a predetermined area are automatically asked to join a group communication group.

Detailed description of the invention

5   In the following the invention and its embodiments will mainly be described in connection with two communications systems. However, the invention and its embodiments are not restricted to the number of communications systems. Also, regarding the invention, the operation and structure of communications systems are described only to a degree that will assist in comprehending the invention and its embodiments. The invention and its embodiments are not specific to the particular communications system, but it will be appreciated that the present invention and its embodiments have application in many system types and may, for example, be applied in a circuit switched domain e.g. in GSM (Global System for Mobile Communications) digital cellular communication system, in a packet switched domain, e.g. in the UMTS (Universal Mobile Telecommunications System) system, and e.g. in networks according to the IEEE 802.11 standards: WLAN, HomeRF or BRAN (Broadband Radio Access Networks) specifications (HIPERLAN1 and 2, HIPERACCESS). The invention and its embodiments can also be applied in ad hoc communications systems, such as an IrDA (Infrared Data Association) network or a Bluetooth network.

The user equipment that can be used to establish the group and group communication or that can be used as group member user equipment according to the invention and its embodiments can be e.g. conventional user equipment that can connect to a wireless local area network. A wireless local area network WLAN is a network in which the mobile user can connect to the local area network through a wireless connection. This kind of user equipment can be described as two-mode user equipment.

Exemplary user equipment is the user equipment according to 3GPP Rel5 or Rel6 (3rd Generation Partnership Project, Release 5/Release 6), i.e. a terminal that supports a UMTS subscriber identity module USIM and the Uu interface. These user equipment can be recognized by an SIP URL (Session Initiation Protocol : Uniform Resource Locator) address. The address can be defined as a uniform resource locator used within a session initiation protocol SIP message to indicate the originator, current destination, and final recipient of an SIP request, and to specify redirection addresses. The SIP URL can

be in the form of sip:user@host.

The user equipment UE1, UE2, UE3 can be a conventional mobile station which is further equipped with a wireless local area network service or capable to communicate any other short-range communications media. Al-
5 though in the following the invention will be described by means of a Bluetooth and a wireless local area network service, the group establishment request and/or the response can comprise e.g. at least one of the following messages: a short message, an instant message, an e-mail message, a multimedia message, a unified messaging message, a WAP (Wireless Application Protocol)
10 message or an SIP (Session Initiation Protocol) message. The mobile stations can also be mobile stations equipped with e.g. an instant message, an e-mail message, a multimedia message, a unified messaging message, a WAP (Wireless Application Protocol) message or an SIP (Session Initiation Protocol) message service.

15 The term 'pico network' can be defined as a wireless network with one or more small cells with a cell radius typically less than 50 metres. Pico networks are typically used in offices and in small outdoor facilities in cities. One typical pico network is a Bluetooth network, which uses technology designed to be embedded in electronic devices in order to provide wireless and
20 seamless connections over short distances. The architecture of a typical Bluetooth pico network N1, as illustrated in Figure 3, comprises three equipments of which a first equipment UEA first enters 3-2 the area of network N1 and then takes the role of master equipment while the other equipment UEB and UEC work as slaves. In the operation of the Bluetooth network the master equip-
25 ment UEA controls the operation of the other devices that are its slaves. UEA can also be defined as the group creator or as a client, while the other group members UEB and UEC can also be defined as servers. Connections in the Bluetooth network can be point-to-point or multipoint connections with the maximum range being about 10 meters.

30 After UEA, the creator of the group, has entered the network N1, e.g. a room in an office building, he has to find out who is present and what are the identifications of the present user equipment. Figure 2 describes these functions for establishing the group by means of a signalling chart. In step 2-2 the user UEA comes to a geographical or a coverage area where a group of
35 equipment is located nearby. If user UEA has decided to establish the group, it can send a multicast request. The request can be sent in broadcast, in which

the invitation, i.e. the request is directed to all mobile station which are located in the same area. In step 2-4 the request is sent to the user UEB using a multi-cast address. This multicast address can be presented as a short identification ID unique in a reserved set or a subset of multicast addresses from which the master equipment can randomly choose one multicast address to be used in the group establishment process. The short ID can be used in person-to-person communication to enable group members to program slave user equipment to receive any request sent to the multicast address by using the short ID instead. This request is transmitted essentially simultaneously to user UEC in step 2-5.

The user equipments UEB and UEC, which are conventionally connected to a second communication network N2, such as a GSM network, are prepared to receive the multicast request within the same first network N1, such as a wireless local are network or a Bluetooth network, handle the request corresponding in steps 2-6 and 2-10. The requested information can comprise information needed to establish the group as described in Figure 1 plus some other additional information, such as priorities. After that UEB and UEC send their responses correspondingly to the group creator UEA in steps 2-8 and 2-12.

In step 2-14 user UEA handles the responses. The information can be presented on the screen of the terminal e.g. as a table or a list. This makes it also easy for the group creator to check the information, to add new members to the group or to delete unwanted members from the table or from the list.

After that group data can be sent in step 2-15 (in Figures 2 and 3) to some suitable element of the communications system. A database can be located outside or inside the first network N1. One example of the database can be a connection processing server CPS in the second network N2. Alternatively, data can be stored e.g. in the terminal of UEA. Still another possibility is to share group data with members of the group. Finally in step 2-16 an accept/reject message is send to user UEB and in step 2-18 to user UEC so that the users know whether they are accepted to the group or not.

One possible implementation of the invention and its embodiments in the above-mentioned situation where a user wants to establish a group communication between nearby users in an office or outside is discussed in the following. The user who is willing to create the group can pick "*Create*

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group" - "*Find from WLAN*" function e.g. from the menu of his equipment terminal. After selecting this function the user equipment can send an invitation to all or to some nearby equipment to join the group. Any one of the equipment which received the invitation can select the function "*Join group*". If the function

5   is selected the equipment can send information to the user equipment of user UEA. After the answer of the equipment has arrived, UEA can select "*Accept members*" - "*Save to system*". Finally user UEA can send a confirmation to all or some members of the group, e.g. as an MMS message (Multimedia Messaging Message) with necessary conventional text with richer content

10 types, such as photographs, images, voice clips, and video clips.

The slave user equipment can be automatically enquired for the information needed to establish the group. Alternatively, the information can be pulled together manually by entering the required information e.g. in fields of the user terminal.

15 An example of the operation of user equipment as slave user equipment is illustrated in Fig. 4. In step 4-2 the slave equipment joins the same network with the master user equipment, after which the slave equip-ment prepares to receive the request in step 4-4. When it has received the re-quest it can send the requested information for the group establishment as the

20 response to the master user equipment in step 4-6.

An example of the operation of user equipment as master user equipment is illustrated in Fig. 5. In step 5-2 the user equipment working as master user equipment joins the same network within nearby terminals. It shares the same identification ID with participants of the network in step 5-4,

25 and sends a request to at least one slave user equipment UEB, UEC in step 5-6 using the ID. The request can be sent via the first communications network prompting the user of the slave user equipment UEB, UEC to send user infor-mation for group establishment. In step 5-8 it receives a response 2-8, 2-12 (Figure 2) comprising user information for group establishment from at least

30 one slave user equipment, and handles the responses. This handling means e.g. creating the group based on the information received in responses from the at least one slave user equipment.

In step 5-10 it is checked whether the data should be stored in the infrastructure. If data is to be stored in the infrastructure, e.g. in a network

35 other than WLAN network, the information on the created group is sent to the infra (step 5-12), e.g. to the second network for establishing said group. If the

data is not stored in the infrastructure, the process proceeds directly to the step 5-14.

In step 5-14 it is checked whether the group data is shared with the members of the group. If yes, the group data is sent to the other group members (step 5-16) and the process ends. If the group data is not shared, the process ends without sending the group data to the other members.

An example of a possible implementation of user equipment UEA, UEB, UEC is illustrated in a simplified block diagram shown Figure 6. An RF part 6-10 represents any radio frequency functions and hardware required by a specific air interface employed. A WLAN part 6-12 represents any wireless local area network functions and hardware required by a specific wireless local area network air interface employed. The actual implementation of the RF part 6-10 or the WLAN part 6-12 is not relevant to the present invention.

Baseband signal processing 6-2 represents any baseband signal processing required in any specific implementation, such as analog-digital (A/D) conversion of the analog speech signal from the microphone 6-4, voice-encoding, IP packet building, frame building, deframing, IP packet debuilding, voice-decoding, digital-analog (D/A) conversion of the received digital speech signal into an analog signal applied to a loudspeaker 6-6.

A controller 6-8 controls the RF part 6-10, the WLAN part 6-12, and the baseband signal processing 6-2. The controller 6-8 controls the signaling, both outband and embedded, as well as IP packet building and debuilding.

A user interface may include a display 6-14 and a keyboard 6-16. It should be appreciated that the blocks illustrated in Figure 6 are functional blocks, which can be implemented in a variety of different circuit configurations. For example, the baseband processing and the controller may be implemented in a single programmable unit (e.g. a CPU or a signal processor) or in a plurality of units.

The operation according to the present invention is primarily related to the controller part of the UE, and the basic invention may be implemented as program modifications in the control program of the UE, for example.

The memory 6-18 can be used e.g. for storing information on the created group(s).

An advantage of the method and arrangement of the invention and its embodiment described above is easier and faster establishment of the

group and hence easier and faster establishment of group communication. Compared to the known solution, the invention is simpler to use.

A disadvantage which seems to arise with the invention is how to address the invitation only to correct users. However, this disadvantage can be alleviated easily as was described above. In case some unwanted users accept the invitation, the user UEA can still select the users from the answers and delete the unwanted answers. Another possibility to solve this problem is to use IP (Internet Protocol) multicasting. This requires the information on the multicasting address of the members of the group and the user who sends the invitation. This means that the sender of the request and the recepient of the request use the same address, i.e. the address must be known by both parties before the request is sent. Furthermore, it should be noted that the invitation must be from inside the network N1. This means that the user equipment of the network N1 is not communicating with a router of the network N1 by IGMP (Internet Group Management Protocol) that they are listening said multicast address. Furthermore, the used multicast address can be a link scoped multicast address or a local scoped multicast address ensuring that the request is not communicated outside the network N1. By using these functionalities only the expected equipment receives the invitation.

Only as an example, one implementation of the invention and its embodiments can use a Bluetooth WLAN network, terminals according to 3GPP Rel5 or Rel6 (3rd Generation Partnership Project, Release 5/Release 6) standards and a Connection Processing Server CPS with group capabilities. The CPS server, which provides call signalling between network elements and supports several simultaneous calls throughout a distributed network, can also work as the database for group information.

From the WLAN point of view the possibility of sending the group message to all terminals attached to the local area network can be replaced by multicasting and the ideas of the Bluetooth network.

In the implementation of an all-IP network user equipment can be user equipment working in a radio access network and one or more databases can be databases in the IP (Internet Protocol) network.

The invention and its embodiments are not restricted to some specific group data or some specific use of group data, but can e.g. be used to collect group information from the Bluetooth network to terminal, and then sending the information to a group management server e.g. for presence and

instant messaging. The established, created group can be used e.g. as an access control list as part of incoming traffic filtering service during a meeting.

The idea of the invention can further be applied to situations in which at least one ad hoc group is created for the persons in the same area. An ad hoc group can be formed automatically or semi-automatically from equipment that happen to be physically near each other. In these groups each equipment has equal status, which means that each equipment can access data stored in all other equipment. This is one example of the idea to use the invention and its embodiments for advertising purposes. These purposes can comprise e.g. asking whether the user in a rock concert is interested in receiving an advertisement from a record store and if one is interested in it, sending a discount coupon to that user.

Referring now to Figure 7, according to an aspect of the invention, clients entering a specific area 70 are automatically requested to send their identities for the group establishment according to the invention. In an embodiment of the invention, equipment handled by a human, e.g. user equipment, or an automated equipment UEA is located near a doorway 71 to a commerce or service facility 70, such as a store, department store, concert hall, restaurant, pub. The equipment UEA is capable of communication over the short distance network N1 with the user equipments CLIENT UE entering the specific area. The doorway may be provided with a detector (not shown), such as motion detector or a detector recognizing entering user equipment. When detecting an entrance of a new client or user equipment, the detector sends indication of the event to the master user equipment UEA. Regardless how the entrance is detected, the master user equipment UEA sends a user information request 81 according to the present invention over the short distance network N1. If no detection is employed, the request may be sent periodically at least in the proximity of the entrance point 71. The request may be in form of a "Who are you?" question, for example. The question is presented to the user of the user equipment CLIENT, i.e. the entering client. Using a menu of the user equipment, the client may switch on and off the feature to answer to the "who are you" question Only if the client allows his UE to answer, the user equipment CLIENT sends the identity of the client to the master equipment UEA over the short distance network N1 and the client is appended to the group when he passes the doorway. The master user equipment UEA sends information on the modified group to the mobile network N2. The same

information can also be sent over the short-range network N1 to other user equipment UE or to a client management unit, such as a workstation WS. There may be another master equipment UEB that asks the same "Who are you?" question on the exit doorway 72. Also the UEB sends the modified group
5   information to the mobile network N2 and/or to other UE or the WS. This way user can be removed from the group and the group is up to date consisting of those people who are present and who allowed attaching them to the group when stepping in. Alternatively and more preferably, no exit monitoring is used but the client may remain as a member of the group for a certain period of time
10   or until he/she cancels the membership.

The owner of the place can easily collect groups i.e. list of clients that have visited his place the same day, the same week, or clients that are on location at the moment, etc. The owner of the place may handle the groups with a client management unit or a workstation, such as a personal computer
15   (PC), and send group messages, invite people to a group session, etc, using the group or groups automatically established and updated in the mobile network N2. The workstation is preferably provided with means for communicating over the short distance network (such as the Bluetooth). It may also have communication means for communication over the mobile network (such as
20   the GSM).The group lists can also be used for advertising and marketing to the group members.

It will be obvious to a person skilled in the art that, as the technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above
25   but may vary within the scope of the claims.